AMENDMENTS TO THE CLAIMS

Claims 1-15. (Canceled)

16. (Currently amended): A biosensor system for processing a sample and detecting one or more target substances in the sample, comprising:

a data processing and control unit;

a microfluidic system couplable ~~coupled~~ to communicate with the data processing and control unit, wherein the microfluidic system includes microfabricated components;

a detection system coupled to receive a processed sample from the microfluidic system and transmit signals regarding the target substances to the data processing and control unit; and

a handheld housing including the data processing and control unit, ~~the microfluidic system,~~ and the detection system, wherein the data processing and control unit and the detection system are permanently fixed in the housing, and the microfluidic system is insertable and removable from the housing.

17. (Original): The system as set forth in claim 16, further comprising a user interface coupled to receive input from a user and provide output to the user, the user interface being further coupled to provide the input from the user to the data processing and control unit.

18. (Original): The system as set forth in claim 17, wherein the output to the user includes information regarding the target substances.

19. (Original): The system as set forth in claim 17, wherein the input from the user includes information regarding the processing to be performed on the sample.

20. (Original): The system as set forth in claim 16, wherein the data processing and control unit processes information from the detection system.

21. (Original): The system as set forth in claim 16, wherein the data processing and control unit includes one or more driver units coupled to control operation of the components in the microfluidic system.

22. (Original): The system as set forth in claim 16, wherein the data processing and control unit includes one or more driver units coupled to control operation of the detection system.

23. (Original): The system as set forth in claim 16, further comprising a thermo-electric cooler for heating and cooling the sample during processing.

24. (Original): The system as set forth in claim 16, wherein the microfabricated components include one or more pumps.

25. (Original): The system as set forth in claim 24, wherein at least one of the pumps is electro-magnetically actuated.

26. (Original): The system as set forth in claim 24, wherein at least one of the pumps is piezoelectrically actuated.

27. (Original): The system as set forth in claim 16, wherein the microfabricated components include one or more mixers.

28. (Original): The system as set forth in claim 27, wherein the one or more mixers include a nozzle for injecting a first substance into a chamber containing the sample.

29. (Original): The system as set forth in claim 16, wherein the microfabricated components include one or more filters.

30. (Original): The system as set forth in claim 16, wherein the microfabricated components include one or more valves.

31. (Withdrawn): A method for purifying and detecting one or more target substances in a sample using a handheld biosensor system, the method comprising:

processing the sample using microfabricated components in the biosensor system;

transferring the processed sample to a sensing platform in the biosensor system; and

detecting the one or more target substances on the sensing platform using a detection system in the biosensor system.

32. (Withdrawn): The method as set forth in claim 31, wherein the processing includes concentrating the sample.

33. (Withdrawn): The method as set forth in claim 31, wherein the processing includes filtering the sample.

34. (Withdrawn): The method as set forth in claim 27, wherein the processing includes heating the sample.

35. (Withdrawn): The method as set forth in claim 31, wherein the processing includes pumping the sample into a reservoir and mixing the sample with a reagent.

36. (Withdrawn): The method as set forth in claim 31, wherein the processing includes washing the sample.

37. (Withdrawn): The method as set forth in claim 31, wherein the processing includes generating driver signals for controlling the microfabricated components.

38. (Withdrawn): The method as set forth in claim 31, wherein the processing includes processing the sample for detecting a toxin.

39. (Withdrawn): The method as set forth in claim 31, wherein the processing includes processing the sample for detecting bacteria.

40. (Withdrawn): The method as set forth in claim 31, wherein the processing

includes processing the sample for detecting a virus.

41. (Withdrawn): The method as set forth in claim 31, wherein the processing includes processing the sample for detecting genetic characteristics.

42. (Withdrawn): The method as set forth in claim 31, wherein the detecting includes illuminating the sample using a laser light source.

43. (Withdrawn): The method as set forth in claim 31, wherein the detecting includes illuminating the sample using a laser light source.

44. (Withdrawn): The method as set forth in claim 31, wherein the detecting includes detecting fluorescence of the processed sample.

45. (Withdrawn): The method as set forth in claim 31, further comprising: communicating detection information to a data processing system within the biosensor device.

46. (Withdrawn): A device for sensing a target substance in a sample comprising means for implementing the method of claim 31.

47. (New): The system as set forth in claim 16, wherein the microfabricated components include one or more flow sensors.

48. (New): The system as set forth in claim 16, further comprising an insert detector configured to detect coupling of the microfluidic system to communicate with the data processing and control unit.

49. (New): The system as set forth in claim 23, further comprising a loading lever operable to place the thermo-electric cooler in contact with the microfluidic system.

50. (New): The system as set forth in claim 47, further comprising a control system

operable to compare an actual flow rate to a desired flow rate in the microfluidic system, and to adjust operation of a pump to achieve the desired flow rate.

51. (New): The system as set forth in claim 30, wherein at least one of the valves is formed as a movable flap in a channel in the microfluidic system, one end of the flap being fixed to one side wall of the channel, and another end of the flap being movable between an open position and a closed position.

52. (New): The system as set forth in claim 51, wherein the flap is angularly positioned across the width of the channel, with the end that is closer to the start of the flow being anchored to the one sidewall of the channel.

53. (New): The system as set forth in claim 51, further comprising a first flap positioned in an inlet channel to a chamber, and a second flap position in an outlet channel from the chamber, wherein a vacuum created by movement of a diaphragm pump in one direction over the chamber forces the free end of the second flap into the sidewall of the outlet channel, thereby preventing backflow from the outlet channel into the chamber, and further wherein a vacuum created by movement of the diaphragm pump in another direction over the chamber forces the free end of the first flap into the sidewall of the inlet channel, thereby preventing flow from the inlet channel into the chamber as a substance in the chamber is expelled from the chamber through the outlet channel.

54. (New): The system as set forth in claim 16, wherein the data processing and control unit is configured to communicate with an information network, and data from the data processing and control unit can be accessed from a remote workstation coupled to the network.

55. (New): The system as set forth in claim 48, wherein a signal from the insert detector is used to start operating other components in the system.

56. (New): The system as set forth in claim 16, wherein the detection system is operable to detect electrical signals from a processed sample.

57. (New): The system as set forth in claim 16, wherein the detection system is operable to detect fluorescence of a processed sample.